



STIC Biotechnology Systems Branch

RAW SEQUENCE LISTING
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Application Serial Number:

10/574,405

Source:

IFWP

Date Processed by STIC:

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Revised 01/10/06



IFWP

RAW SEQUENCE LISTING DATE: 04/13/2006
PATENT APPLICATION: US/10/574,405 TIME: 11:14:31

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Output Set: N:\CRF4\04132006\J574405.raw

3 <110> APPLICANT: Gazit , Ehud
4 Cherny, Izhack
6 <120> TITLE OF INVENTION: NOVEL ANTIBACTERIAL AGENTS AND METHODS OF IDENTIFYING AND
7 UTILIZING SAME
9 <130> FILE REFERENCE: 31689
C--> 11 <140> CURRENT APPLICATION NUMBER: US/10/574,405
C--> 11 <141> CURRENT FILING DATE: 2006-03-31
E--> 11 <160> NUMBER OF SEQ ID NOS: 131
13 <170> SOFTWARE: PatentIn version 3.2

Found 132

Does Not Comply
Corrected Diskette Needed

(pg. 1) 2

ERRORED SEQUENCES

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3014 <211> LENGTH: 20
3015 <212> TYPE: DNA
3016 <213> ORGANISM: Artificial sequence
3018 <220> FEATURE:
3019 <223> OTHER INFORMATION: Single strand DNA oligonucleotide
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E--> 3027 1

20

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VERIFICATION SUMMARY

PATENT APPLICATION: US/10/574,405

DATE: 04/13/2006

TIME: 11:14:32

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L:11 M:270 C: Current Application Number differs, Replaced Current Application No
L:11 M:271 C: Current Filing Date differs, Replaced Current Filing Date
L:3021 M:212 E: (34) Invalid or duplicate Sequence ID Number, SEQUENCE ID NOS:132 differs:4
L:3022 M:254 E: No. of Bases conflict, LENGTH:Input:0 Counted:20 SEQ:132
L:3027 M:254 E: No. of Bases conflict, this line has no nucleotides.
L:11 M:203 E: No. of Seq. differs, <160> Number Of Sequences:Input (131) Counted (132)



1

SEQUENCE LISTING

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Cherny, Izhack

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UTILIZING SAME

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<160> 132

<170> PatentIn version 3.2

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<213> Actinobacillus actinomycetemcomitans

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agtttagaag atttcgcagc ttacgaagaa acggcttatt tattacgcag ccccaaaaat 180

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ctccaggaat ga 252

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<213> Actinobacillus actinomycetemcomitans

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 <212> DNA
 <213> *Enterococcus faecium*

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 tgccgggacc atgagccagc actcatcaca cgcctgcgcg gtgatcatgt agtcatgctt 120
 tcccttgatg actacaactc gatgtcagaa accatgtacc tgctaggcac agaggccaat 180
 gcgaagcacc tgcggcaatc cattgcgcag cacaagccg gaaaagcctt cgtaaaggaa 240
 atttcaactgg atgtcacagg gtcagaaaca gaagaataa 279

<210> 43
 <211> 249
 <212> DNA
 <213> *Pseudomonas syringae*

<400> 43
 gtgcatttca ccctatcggg atgggatgat tacactcact ggaaggatgc cgatcaggca 60
 atttccctgt caatagacag cctcattagc cagtgcctgc gtacgccgtt caaaggcacc 120
 ggtaagccga gacctgac cggcgattta accgggtact ggtcccgccg catcaccaaa 180
 gagcatcgtc ttgtctactt ctatgagggc ggtgtactga cagtcatcgc gtgtcgccat 240
 cattactag 249

<210> 44
 <211> 195
 <212> DNA
 <213> *Rickettsia conorii*

<400> 44
 atgaactcaa ttagcggcac ttcatttaga aaaaacttaa gctctgtact aaataccgta 60

gaaaacgatc atgtccctta tcttattaaa agaaagaatc ataagaatat tattctttta 120
 accgaagaag aatatgaatc tacaaaagaa acattatatt tattatctaa tctggggcta 180
 atgcgaatcg aataa 195

<210> 45
 <211> 234
 <212> DNA
 <213> Rickettsia conorii

<400> 45
 acactagaat cagcggagga tttagcgtat tggaaaaaat acgatattaa aaaatatgaa 60
 cgtattaaac ttctaataaa aaatatcaa gaagcaccgg ttacaggat aggtaagccc 120
 gaacctttaa aacatatatt atcaggttta tggtcacgta gaattaacca cgaacataga 180
 ctaatatatt ctgtcaatac taaacaaatt ataatatata attgtagctt tcat 234

<210> 46
 <211> 228
 <212> DNA
 <213> Salmonella typhi

<400> 46
 atgtttatgc gtacggttaa ctatagcgaa gcgcggcaaa atctggccga agtcctggaa 60
 agtgcggtga cggggggggc tgttaccatc acgcgtcgtg ggcataagtc cgcagtgatc 120
 atcagcgccg aggagtttga gcgttatcag acggcgcgaa tggatgatga gtttgctgcc 180
 attatggcgg ttcattggcaa tgagctcagg gagctggcgg ataatga 228

<210> 47
 <211> 369
 <212> DNA
 <213> Salmonella typhi

<400> 47
 atgaccctac aacttatctc agcgggaagag ataattcagt ttcacgacag gcttctccgc 60
 gttacgcctg gtgtaacagg catgcctgat cctggccgcg cggaagcgct aatgtaccgg 120
 gtactcaagc aaatcgaata tgaaggggtg accgacgtgt ggctgctggc ggcaatgcat 180
 ttgctcgcta tatcccgtgg gcatactctc aatgatggta acaaacgtac cgccttattt 240
 attacgctgc tgtttttaaa gcgtaacggg atctcactcg ctgcgaatcc ggattttgtc 300
 gatatgacag tcgatgcggc ggcagggcgg cttacgctgg agcaaattgc cgttcgctta 360
 cgtgcctga 369

<210> 48
 <211> 252
 <212> DNA
 <213> Streptococcus aureus

<400> 48
 atgattatta aaaattattc atacgctcga cagaatttaa aggcacttat gacaaaagta 60
 aatgatgata gtgatatggt aactgtaaca tctactgatg ataaaaacgt agtaatcatg 120
 tcagaatcag attataactc catgatggaa acactttacc tccaacagaa cccaaataat 180
 gctgaacact tagctcaatc aattgcagat ctagaacgtg ggaaaactat aacgaaagat 240
 atagatgtat aa 252

<210> 49
 <211> 267
 <212> DNA
 <213> Streptococcus aureus

<400> 49
 atggctagg taaatattac gttttcgct caagcctttg aagattataa gtattttcag 60
 cagaacaata aaaaaatggt gaagaagatt aatgagttac ttaaaagtat tgacagaaat 120
 ggtgcattgg aagggtatagg taagcctgaa aagttaaaat cgaatctgac tgggtattat 180
 agtagacgta tcaatcacga acatagattg gtttatacag tagatgacaa tcatataaaa 240
 atagcatcat gtaaatacca ttattaa 267

<210> 50
 <211> 255
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 50
 atggaagcag tcctttactc aacattccga aatcatttaa aggactacat gaagaaggta 60
 aatgatgaat ttgagccttt gacggtggc aataaaaatc cagatgagga cattgtagtc 120
 ctttcaaaga gtgagtgga tagtatcaa gaaaccctga gaattgctca aaataaggaa 180
 ctttctgata aggttttgcg aggaatggct caagttcgtg ctggaagtac tcagggtccat 240
 gttattgagg agtaa 255

<210> 51
 <211> 255
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 51
 atgctgctca agtttacaga agatgcctgg gcagattatt gctactggca aaatcaggat 60
 aagaaaacgt taaaaagaat caataaacta atcaaggata ttcaacgtga tccctttaca 120
 ggaataghta aaccagaacc actcaaatat gattaccaag gagcctggc acggcgtatt 180
 gatgcagaaa atcgcttgat ttatatgatg gatggagata gcgtggcctt cttgtccttt 240
 aaagatcatt actaa 255

<210> 52
 <211> 264
 <212> DNA
 <213> Streptomyces coelicolor

<400> 52
 atgtccatca ccgccagcga agcccgctcag aacctgttcc cgctgataga gcaggtaaac 60
 gaggaccacg ccccggtgca catcacctcc cgcaagggga acgccgtgct catgtccgag 120
 gaggacttca cggcgtggac ggagacgggtg catctcctgc gctcgccgag gaacgcccgc 180
 cgtctgctcg actccatcgc ggaggccgag gcgggacgac cgactgagca cgacctgatc 240
 gaccgggacg cggagcgggc gtga 264

<210> 53
 <211> 255
 <212> DNA
 <213> Streptomyces coelicolor

<400> 53
 gtgaggatca ctttcacgtc ccacggctgg gaggactacg tccactgggc cgagagcgac 60
 cggaagggtga ccaagcgat caacagactg atcgccgaca tcgcccgta cccgttcaag 120
 ggcgtcggca agccggagcc gctcaagggc gacctgtccg gctactggc acggcgcatc 180
 gacgacacgc accgtcttgt gtacaagccc accgatgacc agctgggtcat cgtccaggcg 240
 cgctaccact actga 255

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<210> 54
<211> 282
<212> DNA
<213> Streptomyces viridochromogenes

<400> 54
atgtcgataa accgcgagcg aagccgcaag gctctctttc cgctgatcaa gaaggtaaac      60
gacaatcacg aggccatcga gatcgtctcc aagcacggca acgccgtact cgtctcggcc      120
gaggattatg cagcgctgcg cgagggctcg tacctgctgc gctctccggc gaacgcccg      180
cgactgctca aggcgtacga gaacgccctt gccacgtca atgtgtcgga gcgggagctg      240
atcgatccgg attcggcgga cgctgggtcg ggtgccgcgt ga                        282

<210> 55
<211> 255
<212> DNA
<213> Streptomyces viridochromogenes

<400> 55
gtgaggcttg tcttcgagga tcagggtggt gatgactaca cgtcctggct caagaacgac      60
cgcaagatgc tcgcccgcat caacaagctc atcgaggacg tcaggcgcgga ccccttcacg      120
gggatcgcca aacccgagcc gctgaagtac cacttgccgg gggcggtggt gcggcggtac      180
gacgacgaac accgcctcgt gtacctggtt acggacaagg agatcgtgat cctcgctgcc      240
cggtaccact actga                        255

<210> 56
<211> 303
<212> DNA
<213> Synechocystis sp. PCC 7942

<400> 56
ttggctaagt gctattgttg tacaacaagc tgtacaactc ctcggctcat gaaagttggt      60
tccttcagtg acgccagaaa aaatctcaag actgtcttgg atgaagtcgt caacgacgct      120
gactacacga tcattactcg ccgcaatgcc gaggaagtcg tggatcatgt cctcgactcc      180
ttcaatagcc tgatcgaaac cttccacctg ctcaaatccc ctgccaatgc tgctcaccta      240
caacgctcga tcgctcagta ccagcaaggt caaacagtcg agcgaaatct attagatgcg      300
taa                                      303

<210> 57
<211> 264
<212> DNA
<213> Synechocystis sp. PCC 7942

<400> 57
atgcgtaagc tggcttggtg aaacgaggct tgggaagatt acctgtattg gcaagggcag      60
gacaagaaga ccttaaatac catcaacaag ctcatcaccg aaaccttgcg atcgcccttt      120
gaggggattg gtaagccaga agcgctcagg gagaacctga ctgggttttg gtcacgccgc      180
attgacgaca ccaatcgctt agtttacgca gtagcagatg actacctgac cattatttcc      240
tgctcgctacc actacagcga ttaa                        264

<210> 58
<211> 264
<212> DNA
<213> Synechocystis sp. PCC 6803 A

<400> 58
atgaaagcaa ttacaaccac ccaagccaaa gatcatttgg atgaattaat taatgctgtc      60
atttctgatc tagaaccaac catcgtttag aacaatcaag gtcagcaggc ggtattaata      120

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13

tcattggatg aatttaattc ttggcaagaa accctttact tactctctaa tccaaccaac 180
gcagaacatt taatggcatc gattaagcaa gctgaaactg gacagatcat taagcaaaaa 240
ttaccagatt tattggaact gtga 264

<210> 59
<211> 261
<212> DNA
<213> Synechocystis sp. PCC 6803 A

<400> 59
gtgaaaatcg cctttaccga gctatcttgg catgattacc tctggtttca gcaaaatgat 60
aaaaaacttc tcaaaagaat taatttactc attaaggcaa ttgccaggga tccttttgat 120
ggtataggaa aaccagaacc actcaaagca aatctttccg gttactggtc gaggcgcac 180
aattctgagc atcgtttggg gtacacgatt gctgatcgag atttactaat tatttcctgc 240
cgattccatt atcaaaggta a 261

<210> 60
<211> 264
<212> DNA
<213> Synechocystis sp. PCC 6803 B

<400> 60
atggaaacca ttaattatca acaattctct gaaaaactgc ccactttggg agaaaaaata 60
ggtaatgagc aagaacctct ctgtctagag ctccgaatt atttacgagc tgttattata 120
tctgagcaag attaccgtag tttgatggaa actgtttatc tgttgagtaa cctgtttaat 180
gctgaaaagt tattaactac cgctagtcga tcaattgatc aagctacatc gtggacaaaa 240
gtaaaaaatg acttaggact atga 264

<210> 61
<211> 261
<212> DNA
<213> Synechocystis sp. PCC 6803 B

<400> 61
atgaaggag ttgtttttaga ttcgcaggca attgaagata taaagtggg gattcaacaa 60
gataaaaagt tagcgtaaaa aatcatggaa ttaattgaga cgctacaaa atcacctttt 120
gccggcaag gaaaaccaga aaaacttcgt tttaatttgt caggtttttg gccacggcgc 180
attactcaag agcatcgct agtttacgaa gtcaccgatg atttcattcg tgtgtcagt 240
tgtcgttatc attaccgata g 261

<210> 62
<211> 243
<212> DNA
<213> Tiobacillus ferrooxidant

<400> 62
atgtccaccc tcaactgcaag cgaagcacgc gccaacctat atcggtcat tgaccaagcc 60
gctgagtcac atcagcccat ttatatcgcc ggaaagcgga caagtgcggc cttctctctc 120
acggaagatt gggaagcaat ccaagaaaca ctatacctcc ttccggttcc gggcatgcgc 180
gaatctatca aggagggtat ggctgagccc cttagcaaga gcaatatgga cctcaagtgg 240
tga 261

<210> 63
<211> 252
<212> DNA
<213> Tiobacillus ferrooxidant

<400> 63
gtggtctatt cgaaacacgc gcagaaggat gcgaagaagc tggcggctgc tggcttaaaa 60
aacaacgcaa tagaactcct ggccgttctt gccgccgac catttcagaa cccgccaccc 120
tacgagaatc tcgtaggcga cctcgccggc gcgtattcac gacgcatcaa cattcagcat 180
cgtttggttt atgaagtctt tccaaaggag cgagtggttc gcgtgttgcg catgtggacg 240
cactatgagt ga 252

<210> 64
<211> 252
<212> DNA
<213> *Yersinia enterocolitica*

<400> 64
atgagaacaa ttgattatag tgaagcgcgc cagaatttgt cgacaacgat ggtgcaaacy 60
gttaggagtc gagccccat cctcatcacc cgtcaaatg ggacttcttg tgttcttatg 120
tcacttgaag aatatgaatc attggaagaa actgcttatt tattgcgttc accagcaaac 180
gcgaagcact tgatggactc aattgaagag ttgagagcag gaaaaggaat tcaaagggaa 240
cttgaagcgt ga 252

<210> 65
<211> 255
<212> DNA
<213> *Yersinia enterocolitica*

<400> 65
gtgaaaatta tattttccag ttgttcttgg gaggattatc tttattggca acaaacggat 60
aagaaaatcc tcaaacgcat taatgggtta gtaaaaaata ttcaaagaac gccatttgag 120
gtaaagggca aaccagaacc ccttaaacad aatctggcag ggttctggtc acggaggatg 180
acagaagagc acagacttgt ttatgaggtt tccgggtgata atttattaat tgctgcttat 240
cgttactatt attga 255

<210> 66
<211> 210
<212> DNA
<213> *Yersinia enterocolitica*

<400> 66
atgaatagca tcagttatac agccgcaaga aataatttag ccaagggtatt attggaagca 60
caaaagcagc ccgtagaaat cacgcgccgt gggcagagtg aggtctatat taccagcaag 120
gctgattatg aggatttgat gaaagcaaag gtaaaggcac atattcaatt taaacatgca 180
gaaaccatta aagctcttgc tgatagatga 210

<210> 67
<211> 357
<212> DNA
<213> *Yersinia enterocolitica*

<400> 67
atgatatttt taacggcaaa tgatattgag gagtttaacg cagaaattat ccctaacggc 60
aggcctgata atagtaagat tgaggctgta gccagccgag tattaaatgc acatcattat 120
gacaacgttg atgatgtata tcagtttagc gctatctact taattgccat tagtcgaggt 180
cacatttttc ttgatgggaa caagcgcacg gcatttcaaa gcatggcgct gttccttggt 240
ataaatggcg tagacctgtg tgcaagcaat caactggaag aattaaccgt tgaagcagcg 300
caaggaaaaa ttggtgttga gcagataacg gaacagttac gcgagcttac cgagtaa 357

<210> 68
 <211> 83
 <212> PRT
 <213> Actinobacillus actinomycetemcomitans

<400> 68

Met Asn Val Ile Ser Tyr Ser Ala Phe Arg Ala Glu Leu Ala Thr Thr
 1 5 10 15

Leu Asp Gln Val Val Ala Asp His Ser Pro Val Met Ile Thr Arg Gln
 20 25 30

Asn Gly Lys His Ala Val Val Met Ser Leu Glu Asp Phe Ala Ala Tyr
 35 40 45

Glu Glu Thr Ala Tyr Leu Leu Arg Ser Pro Lys Asn Arg Glu Arg Leu
 50 55 60

Leu Ala Ser Ile Asp Gln Leu Asn Ser Gly Lys Ile Ile Glu Arg Glu
 65 70 75 80

Leu Gln Glu

<210> 69
 <211> 84
 <212> PRT
 <213> Actinobacillus actinomycetemcomitans

<400> 69

Met Ile Leu Ala Trp Thr Glu Thr Ala Trp Glu Asp Tyr Leu Tyr Trp
 1 5 10 15

Gln Gln Val Asp Lys Lys Thr Leu Leu Arg Ile Asn Lys Leu Ile Gln
 20 25 30

Asn Ile Thr Arg Ser Pro Phe Glu Gly Leu Gly Asn Pro Lys Pro Leu
 35 40 45

Lys His Gln Leu Ser Gly Phe Trp Ser Arg Arg Ile Asp Lys Glu His
 50 55 60

Arg Leu Val Tyr Gln Val Ser Asp Ser His Leu Thr Ile Ile Gln Cys
 65 70 75 80

Arg Tyr His Tyr

<210> 70
 <211> 84
 <212> PRT
 <213> Agrobacterium tumefaciens

<400> 70

Met Ala Asn Val Arg Phe Thr Glu Phe Arg Gln Asn Phe Ala Thr His
 1 5 10 15

Phe Asp Arg Val Leu Glu Thr Arg Ala Pro Leu Leu Val Thr Arg Gln
 20 25 30

Gly Lys Glu Ala Val Val Val Leu Ala Glu Gly Glu Tyr Glu Ser Met
 35 40 45

Gln Glu Thr Leu His Leu Leu Ser Asn Pro Ala Asn Ala Ser Arg Leu
 50 55 60

Arg Ala Ser Met Gly Glu Leu Glu Arg Gly Asp Thr Ile Glu Arg Asp
 65 70 75 80

Pro Thr Glu Glu

<210> 71
 <211> 89
 <212> PRT
 <213> Agrobacterium tumefaciens

<400> 71

Met Lys Leu Val Trp Thr Leu Ser Ser Trp Asp Asp Tyr Glu Phe Trp
 1 5 10 15

Gln Arg Thr Asp Ala Arg Met Val Glu Lys Ile Asn Asp Leu Ile Arg
 20 25 30

Asn Ala Lys Arg Thr Pro Phe Ala Gly Leu Gly Lys Pro Glu Pro Leu
 35 40 45

Lys Gly Asp Met Ala Gly Tyr Trp Ser Arg Arg Ile Thr Ala Glu His
 50 55 60

Arg Phe Val Tyr Arg Val Ser Gly Ser Gly Ser Glu Gln Arg Leu Glu
 65 70 75 80

Val Ile Gln Cys Arg Phe His Tyr Gln
 85

<210> 72
 <211> 82
 <212> PRT
 <213> Burkholderia cepacia

<400> 72

Met Asn Val Leu Thr Tyr Ser Glu Ala Arg Ala Gly Phe Lys Gln Ala
 1 5 10 15

Met Asp Asp Val Cys Arg Asp His Ile Pro Met Leu Ile Thr Arg Gln
 20 25 30

Thr Gly Glu Asn Val Val Met Val Ser Leu Ala Asp Phe Asn Ala Met
 35 40 45

Gln Glu Thr Leu Tyr Leu Leu Ser Ser Ser Lys Asn Ala Gln Arg Leu
 50 55 60

Ala Arg Ser Ile Ala Gln Leu Asn Ala Gly Gly Ala Thr Ala Arg Glu
 65 70 75 80

Leu Leu

<210> 73
 <211> 83
 <212> PRT
 <213> Burkholderia cepacia

<400> 73

Met Phe Thr Asp Asp Ala Trp Asp Asp Tyr Leu Tyr Trp Gln Glu Thr
 1 5 10 15

Asp Arg Lys Val Val Arg Lys Ile Asn Thr Leu Leu Glu Glu Cys Arg
 20 25 30

Arg Asp Pro Tyr Arg Gly Thr Gly Lys Pro Glu Ala Leu Met Gly Ser
 35 40 45

Met Ser Gly Leu Trp Ser Arg Arg Ile Thr Leu Ala Asp Arg Leu Val
 50 55 60

Tyr Leu Pro Arg Asp Gly Lys Ile Tyr Val Ile Ala Phe Arg Phe His
 65 70 75 80

Tyr Asp Cys

<210> 74

<211> 84

<212> PRT

<213> Coxiella burnetii

<400> 74

Met Asn Val Val Thr Phe Ser Glu Leu Arg Ala Gln Leu Lys Lys Ile
 1 5 10 15

Leu Asp Leu Ser Ala Asp Gln His Glu Pro Val Val Val Lys Arg Pro
 20 25 30

Asn Lys Glu Thr Met Val Ile Leu Ser Leu Arg Asp Phe Glu Ala Leu
 35 40 45

Lys Glu Thr Ala Tyr Leu Leu Ser Asn Glu Ala Asn Ala Ala Arg Leu
 50 55 60

Arg Gln Ser Ile Arg Ser Leu Lys Gln Gly Lys Ala Gln Lys Lys Lys
 65 70 75 80

Leu Met Glu Asp

<210> 75

<211> 91

<212> PRT

<213> Coxiella burnetii

<400> 75

Met Gln Ile Ser Phe Thr Pro Glu Ala Trp Glu Asp Tyr Leu Tyr Trp
 1 5 10 15

Gln Lys Phe Asp Lys Lys Met Leu Arg Arg Ile Asn Glu Leu Ile Lys
 20 25 30

Asp Ala Met His Glu Pro Phe Ser Gly Lys Gly Lys Pro Glu Pro Leu
 35 40 45

Lys Phe Glu Leu Gln Gly Tyr Trp Ser Arg Arg Leu Asp Gln Glu His
 50 55 60

18

Arg Leu Val Tyr Lys Val Leu Asp Asp Ser Leu Met Ile Ile Ala Ala
65 70 75 80

Arg Phe His Tyr Asn Arg Leu Asn Ser Lys Asn
85 90

<210> 76
<211> 92
<212> PRT
<213> Escherichia coli

<400> 76

Met Asn Cys Thr Lys Glu Glu Ile Asp Met Arg Thr Ile Ser Tyr Ser
1 5 10 15

Glu Ala Arg Gln Asn Leu Ser Ala Thr Met Met Lys Ala Val Glu Asp
20 25 30

His Ala Pro Ile Leu Ile Thr Arg Gln Asn Gly Glu Ala Cys Val Leu
35 40 45

Met Ser Leu Glu Glu Tyr Asn Ser Leu Glu Glu Thr Ala Tyr Leu Leu
50 55 60

Arg Ser Pro Ala Asn Ala Arg Arg Leu Met Asp Ser Ile Asp Ser Leu
65 70 75 80

Lys Ser Gly Lys Gly Thr Glu Lys Asp Ile Ile Glu
85 90

<210> 77
<211> 84
<212> PRT
<213> Escherichia coli

<400> 77

Met Lys Leu Ile Trp Ser Glu Glu Ser Trp Asp Asp Tyr Leu Tyr Trp
1 5 10 15

Gln Glu Thr Asp Lys Arg Ile Val Lys Lys Ile Asn Glu Leu Ile Lys
20 25 30

Asp Thr Arg Arg Thr Pro Phe Glu Gly Lys Gly Lys Pro Glu Pro Leu
35 40 45

Lys His Asn Leu Ser Gly Phe Trp Ser Arg Arg Ile Thr Glu Glu His
50 55 60

Arg Leu Val Tyr Ala Val Thr Asp Asp Ser Leu Leu Ile Ala Ala Cys
65 70 75 80

Arg Tyr His Tyr

<210> 78
<211> 89
<212> PRT
<213> Enterococcus faecium

<400> 78

Met Glu Ala Val Ala Tyr Ser Asn Phe Arg Gln Asn Leu Arg Ser Tyr
1 5 10 15

Met Lys Gln Val Asn Glu Asp Ala Glu Thr Leu Ile Val Thr Ser Lys
20 25 30

Asp Val Glu Asp Thr Val Val Val Leu Ser Lys Arg Asp Tyr Asp Ser
35 40 45

Met Gln Glu Thr Leu Arg Thr Leu Ser Asn Asn Tyr Val Met Glu Lys
50 55 60

Ile Arg Arg Gly Asp Glu Gln Phe Ser Lys Gly Ala Phe Lys Thr His
65 70 75 80

Asp Leu Ile Glu Val Glu Ser Asp Asp
85

<210> 79
<211> 85
<212> PRT
<213> Enterococcus faecium

<400> 79

Met Ile Lys Ala Trp Ser Asp Asp Ala Trp Asp Asp Tyr Leu Tyr Trp
1 5 10 15

His Glu Gln Gly Asn Lys Ser Asn Ile Lys Lys Ile Asn Lys Leu Ile
20 25 30

Lys Asp Ile Asp Arg Ser Pro Phe Ala Gly Leu Gly Lys Pro Glu Pro
35 40 45

Leu Lys His Asp Leu Ser Gly Lys Trp Ser Arg Arg Ile Thr Asp Glu
50 55 60

His Arg Leu Ile Tyr Arg Val Glu Asn Glu Thr Ile Phe Ile Tyr Ser
65 70 75 80

Ala Lys Asp His Tyr
85

<210> 80
<211> 85
<212> PRT
<213> Francisella tularensis

<400> 80

Met Gln Thr Val Asn Tyr Ser Thr Phe Arg Asn Glu Leu Ser Asp Ser
1 5 10 15

Met Asp Arg Val Thr Lys Asn His Ser Pro Met Ile Val Thr Arg Gly
20 25 30

Ser Lys Lys Glu Ala Val Val Met Met Ser Leu Glu Asp Phe Lys Ala
35 40 45

Tyr Glu Glu Thr Ala Tyr Leu Met Arg Ser Met Asn Asn Tyr Lys Arg
50 55 60

Leu Gln Asn Ser Ile Asp Glu Val Glu Ser Gly Leu Ala Ile Gln Lys
65 70 75 80

Glu Leu Ile Glu Glu

85

<210> 81
 <211> 68
 <212> PRT
 <213> Francisella tularensis

<400> 81

Met Ile Leu Ser Trp Ser Thr Asn Ala Trp Glu Asp Tyr Leu Tyr Trp
 1 5 10 15

Gln Ser Ile Asp Lys Lys Lys Leu Lys Arg Ile Asn Leu Leu Ile Lys
 20 25 30

Asp Ile Met Arg Asn His Phe Glu Gly Leu Gly Glu Pro Glu Pro Leu
 35 40 45

Lys His Asn Phe Ser Gly Tyr Trp Ser Arg Arg Ile Asp Lys Glu His
 50 55 60

Leu Asn Asn Leu
 65

<210> 82
 <211> 73
 <212> PRT
 <213> Klebsiella pneumoniae

<400> 82

Met Arg Thr Val Asn Tyr Ser Glu Ala Arg Gln Asn Leu Ala Asp Val
 1 5 10 15

Leu Glu Ser Ala Val Thr Gly Val Pro Val Thr Ile Thr Arg Arg Gly
 20 25 30

His Lys Ser Ala Val Ile Ile Ser Ala Glu Glu Phe Glu Arg Tyr Gln
 35 40 45

Ala Ala Arg Met Asp Asp Glu Phe Ala Ala Ile Met Ala Val His Gly
 50 55 60

Asp Glu Ile Arg Glu Leu Ala Asp Lys
 65 70

<210> 83
 <211> 122
 <212> PRT
 <213> Klebsiella pneumoniae

<400> 83

Met Thr Leu Gln Ile Ile Ser Ala Glu Glu Ile Ile Gln Phe His Asp
 1 5 10 15

Arg Leu Leu Arg Val Thr Pro Gly Val Ala Gly Met Pro Asp Pro Gly
 20 25 30

Arg Ala Glu Ala Ile Met Tyr Arg Val Leu Asn Lys Ile Glu Tyr Glu
 35 40 45

Gly Val Thr Asp Val Trp Arg Leu Ala Ala Met His Leu Leu Ala Ile
 50 55 60

21

Ser Arg Gly His Ile Phe Asn Asp Gly Asn Lys Arg Thr Ala Leu Phe
65 70 75 80

Ile Thr Leu Leu Phe Leu Lys Arg Asn Gly Ile Ile Leu Pro Ala Asn
85 90 95

Pro Asp Phe Val Gly Met Thr Val Glu Ala Ala Ala Gly Gln Leu Thr
100 105 110

Leu Glu Gln Ile Val Ala Arg Leu Arg Gly
115 120

<210> 84

<211> 91

<212> PRT

<213> Mycobacterium bovis

<400> 84

Met Ser Ile Ser Ala Ser Glu Ala Arg Gln Arg Leu Phe Pro Leu Ile
1 5 10 15

Glu Gln Val Asn Thr Asp His Gln Pro Val Arg Ile Thr Ser Arg Ala
20 25 30

Gly Asp Ala Val Leu Met Ser Ala Asp Asp Tyr Asp Ala Trp Gln Glu
35 40 45

Thr Val Tyr Leu Leu Arg Ser Pro Glu Asn Ala Arg Arg Leu Met Glu
50 55 60

Ala Val Ala Arg Asp Lys Ala Gly His Ser Ala Phe Thr Lys Ser Val
65 70 75 80

Asp Glu Leu Arg Glu Met Ala Gly Gly Glu Glu
85 90

<210> 85

<211> 85

<212> PRT

<213> Mycobacterium bovis

<400> 85

Met Arg Ser Val Asn Phe Asp Pro Asp Ala Trp Glu Asp Phe Leu Phe
1 5 10 15

Trp Leu Ala Ala Asp Arg Lys Thr Ala Arg Arg Ile Thr Arg Leu Ile
20 25 30

Gly Glu Ile Gln Arg Asp Pro Phe Ser Gly Ile Gly Lys Pro Glu Pro
35 40 45

Leu Gln Gly Glu Leu Ser Gly Tyr Trp Ser Arg Arg Ile Asp Asp Glu
50 55 60

His Arg Leu Val Tyr Arg Ala Gly Asp Asp Glu Val Thr Met Leu Lys
65 70 75 80

Ala Arg Tyr His Tyr
85

<210> 86

<211> 91

<212> PRT

<213> Mycobacterium tuberculosis

<400> 86

Met Ser Ile Ser Ala Ser Glu Ala Arg Gln Arg Leu Phe Pro Leu Ile
1 5 10 15

Glu Gln Val Asn Thr Asp His Gln Pro Val Arg Ile Thr Ser Arg Ala
20 25 30

Gly Asp Ala Val Leu Met Ser Ala Asp Asp Tyr Asp Ala Trp Gln Glu
35 40 45

Thr Val Tyr Leu Leu Arg Ser Pro Glu Asn Ala Arg Arg Leu Met Glu
50 55 60

Ala Val Ala Arg Asp Lys Ala Gly His Ser Ala Phe Thr Lys Ser Val
65 70 75 80

Asp Glu Leu Arg Glu Met Ala Gly Gly Glu Glu
85 90

<210> 87

<211> 85

<212> PRT

<213> Mycobacterium tuberculosis

<400> 87

Met Arg Ser Val Asn Phe Asp Pro Asp Ala Trp Glu Asp Phe Leu Phe
1 5 10 15

Trp Leu Ala Ala Asp Arg Lys Thr Ala Arg Arg Ile Thr Arg Leu Ile
20 25 30

Gly Glu Ile Gln Arg Asp Pro Phe Ser Gly Ile Gly Lys Pro Glu Pro
35 40 45

Leu Gln Gly Glu Leu Ser Gly Tyr Trp Ser Arg Arg Ile Asp Asp Glu
50 55 60

His Arg Leu Val Tyr Arg Ala Gly Asp Asp Glu Val Thr Met Leu Lys
65 70 75 80

Ala Arg Tyr His Tyr
85

<210> 88

<211> 98

<212> PRT

<213> Neisseria europea A

<400> 88

Met Ala Glu Cys Asn Val Gln Ile Asn Val Gln Leu Glu Asn Leu Met
1 5 10 15

Asp Ala Ile Thr Tyr Ser Thr Ala Arg Ala Lys Leu Ala Asp Thr Met
20 25 30

Asn Arg Val Cys Asp Asn His Glu Pro Ile Ile Ile Thr Arg Asn Gly
35 40 45

Glu Gln Ser Val Val Met Met Ser Leu Asp Asp Phe Lys Ala Leu Glu

23

50

55

60

Glu Thr Ser Tyr Leu Leu Arg Ser Pro Lys Asn Ala Lys Arg Leu Leu
65 70 75 80

Glu Ser Ile Ala Ala Leu Glu Ser Gly Arg Gly Glu Thr Arg Ser Leu
85 90 95

Ala Glu

<210> 89
<211> 84
<212> PRT
<213> Neisseria europea A

<400> 89

Met Lys Leu Val Phe Ser Glu Gln Ala Trp Glu Asp Tyr Leu Tyr Trp
1 5 10 15

Gln Lys Thr Asp Arg Lys Thr Val Gln Arg Ile Asp Thr Leu Val Lys
20 25 30

Glu Ile Thr Arg Thr Pro His Glu Gly Thr Gly Lys Pro Glu Pro Leu
35 40 45

Lys His Ala Leu Ser Gly Tyr Trp Ser Arg Arg Ile Asn Asn Glu His
50 55 60

Arg Ile Val Tyr Lys Ile Ala Asp Asp Ser Leu Phe Ile Ala Gln Leu
65 70 75 80

Arg Tyr His Tyr

<210> 90
<211> 102
<212> PRT
<213> Neisseria europea B

<400> 90

Met Tyr Leu Phe Tyr Thr Cys Thr Ile Tyr Cys Ala Asn Glu Val Ala
1 5 10 15

Met Lys Val Val Thr Tyr Ser His Ala Arg Asn Ala Leu Lys Ser Ile
20 25 30

Leu Asp Asp Val Ile Gln Asp Ala Asp Val Ile Val Ile Ser Arg Arg
35 40 45

Asp Ala Glu Gly Asp Ala Val Val Met Ser Leu Asp Ser Tyr Asn Ser
50 55 60

Ile Met Glu Thr Leu His Leu Thr Ser Asn Pro Ala Asn Ala Ala Ala
65 70 75 80

Leu Ala Lys Ala Ile Ala Gln Asp Lys Ala Gly Gln Ala Gln Asp His
85 90 95

Pro Leu Leu Ser Ala Asp
100

<210> 91
 <211> 86
 <212> PRT
 <213> Neisseria europea B

<400> 91

Met Arg Ala Ile Arg Phe Val Pro Asp Ala Trp Glu Ala Tyr Leu Tyr
 1 5 10 15

Trp Gln Asp Gln Asp Lys Lys Thr Leu Arg Arg Leu Asn Ser Leu Ile
 20 25 30

Thr Ala Ala Ser Arg Asp Pro Phe Val Gly Ile Gly Lys Pro Glu Pro
 35 40 45

Leu Arg Gly Glu Leu Ser Gly Tyr Trp Ser Arg Arg Ile Asp Glu Thr
 50 55 60

Asn Arg Leu Val Tyr Arg Val Thr Asp Val Glu Leu Val Ile Ile Ala
 65 70 75 80

Cys Arg Phe His Tyr Glu
 85

<210> 92
 <211> 80
 <212> PRT
 <213> Neisseria europea C

<400> 92

Met Ala Ile Leu Asn Ala Thr Glu Ala Arg Ala Arg Leu Tyr Ala Leu
 1 5 10 15

Ile Asp Glu Ala Ala Glu Thr His Gln Pro Ile Val Ile Lys Gly Lys
 20 25 30

Arg Ser Ser Ala Val Leu Leu Ser Glu Glu Asp Trp Asn Ala Ile Asn
 35 40 45

Glu Thr Leu Tyr Leu Val Ser Ile Pro Gly Met Arg Glu Ser Ile Met
 50 55 60

Glu Gly Met Lys Thr Asp Val Asp Glu Cys Ser Arg Glu Leu Asp Trp
 65 70 75 80

<210> 93
 <211> 86
 <212> PRT
 <213> Neisseria europea C

<400> 93

Met Trp Glu Leu Arg Tyr Thr His Gln Ala Gln Lys Asp Ala Lys Lys
 1 5 10 15

Leu Ala Ser Ser Gly Leu Lys Asp Lys Ala Glu Glu Leu Leu Ala Val
 20 25 30

Val Arg Asn Asn Pro Tyr Gln Thr Pro Pro Pro Tyr Glu Lys Leu Val
 35 40 45

Gly Asp Leu Ala Gly Ala Cys Ser Arg Arg Ile Asn Ile Gln His Arg
 50 55 60

Leu Val Tyr Gln Val Leu Glu Arg Glu Arg Ile Val Lys Val Leu Arg
65 70 75 80

Met Trp Thr His Tyr Val
85

<210> 94
<211> 135
<212> PRT
<213> Nostoc sp. PCC 7120

<400> 94

Met Tyr Trp Ile Lys Phe Glu Ser Thr Gln Arg Glu Leu Leu Ile Leu
1 5 10 15

Met Leu Ser Asn Thr Tyr Thr Tyr Thr Gln Ala Arg Asp Arg Leu Ser
20 25 30

Glu Leu Cys Asp Lys Val Thr Ser Glu Arg Asp Phe Val Val Ile Thr
35 40 45

Arg Arg Asn Ala Glu Asn Val Ala Leu Ile Pro Val Asp Glu Leu Ser
50 55 60

Ser Leu Leu Glu Thr Ala His Leu Leu Arg Ser Pro Arg Asn Ala Glu
65 70 75 80

Arg Leu Leu Arg Ala Leu Asp Arg Ala Lys Ser Gly Val Val Glu Ser
85 90 95

Gln Ser Leu Asp Asp Ile Arg Lys Glu Leu Gly Phe Asp Gln Lys Glu
100 105 110

Glu Ser Gln Lys Pro Ile Lys Arg Arg Ser Ser Ser Asn Ser Lys Ala
115 120 125

Lys Lys Asn Ser Val Ser Thr
130 135

<210> 95
<211> 81
<212> PRT
<213> Nostoc sp. PCC 7120

<400> 95

Met Phe Gln Pro Glu Phe Leu Glu Asp Leu Glu Phe Trp Val Glu Thr
1 5 10 15

Asn Gln Arg Val Ala Leu Lys Ala Leu Asp Leu Val Lys Glu Thr Cys
20 25 30

Arg Asp Pro Phe Lys Gly Lys Gly Lys Pro Glu Pro Leu Lys Tyr Leu
35 40 45

Asp Pro Asp Thr Trp Ser Arg Arg Leu Thr Gln Glu His Arg Ile Val
50 55 60

Tyr Leu Val Lys Asp Asp Glu Ile Asn Phe Leu Gln Ala Arg Tyr His
65 70 75 80

Tyr

<210> 96
 <211> 84
 <212> PRT
 <213> Pseudomonas fluorescence

<400> 96

Met Asp Thr Ile Asn Tyr Thr Thr Ala Arg Ala His Leu Ala Glu Thr
 1 5 10 15

Met Asp Arg Val Asn Glu Asp Cys Ala Pro Leu Leu Val Thr Arg Gln
 20 25 30

Lys Gly Glu Pro Val Val Met Met Ser Leu Ala Glu Tyr Asn Ala Leu
 35 40 45

Glu Glu Thr Ala Tyr Leu Leu Arg Ser Pro Ala Asn Ala Glu Arg Leu
 50 55 60

Ile Lys Ser Ile Gly Glu Met Arg Ala Gly Lys Ala Lys Val Arg Gln
 65 70 75 80

Leu Ile Glu Glu

<210> 97
 <211> 84
 <212> PRT
 <213> Pseudomonas fluorescence

<400> 97

Met Lys Ile Gln Phe Thr Pro Thr Gly Trp Glu Asp Tyr Leu Trp Phe
 1 5 10 15

Gln Gln Asn Asp Lys Ala Gly Leu Lys Arg Ile Asn Leu Leu Ile Lys
 20 25 30

Ala Ile Gln Arg Gln Pro Phe Glu Gly Leu Gly Lys Pro Glu Pro Leu
 35 40 45

Lys His Asn Met Ser Gly Phe Trp Ser Arg Arg Ile Thr Ala Glu His
 50 55 60

Arg Leu Val Tyr Ala Ile Val Asp Gly Glu Ile Cys Val Ile Thr Cys
 65 70 75 80

Arg Phe His Tyr

<210> 98
 <211> 94
 <212> PRT
 <213> Pseudomonas putida

<400> 98

Met His Val Leu Thr Phe Ser Gln Ala Arg Ala Glu Leu Lys Gln Thr
 1 5 10 15

Met Asp Asp Val Cys Arg Asp His Glu Pro Ala Val Ile Thr Arg Gln
 20 25 30

Arg Gly Glu Pro Val Val Met Met Ser Leu Glu Asp Tyr Asn Gly Met
35 40 45

Asn Glu Thr Ile His Leu Leu Gly Ser Ser Lys Asn Ala Ser Arg Leu
50 55 60

Arg Ser Ser Ile Ala Gln Leu Arg Asp Gly Gln Ala Leu Thr Lys Glu
65 70 75 80

Leu Asp Leu Asn Glu Gln Glu Pro Glu Ala Ala Glu Gln Glu
85 90

<210> 99

<211> 84

<212> PRT

<213> Pseudomonas putida

<400> 99

Met Lys Phe Thr Lys Glu Gly Trp Glu Asp Tyr Cys His Trp Gln Asn
1 5 10 15

Ala Asp Leu Thr Ile Leu Gly Asn Ile Asn Arg Leu Ile Asp Val Cys
20 25 30

Leu Arg Thr Pro Phe Thr Gly Ile Gly Lys Pro Glu Pro Leu Lys Gly
35 40 45

Asp Leu Ser Gly Leu Trp Ser Arg Arg Ile Thr Arg Glu His Arg Leu
50 55 60

Val Tyr Phe Phe Glu Ala Gly Met Leu Thr Val Leu Gln Cys Arg Tyr
65 70 75 80

His Tyr Asp Asp

<210> 100

<211> 92

<212> PRT

<213> Pseudomonas syringae

<400> 100

Met Gln Val Leu Ser Phe Ser Gln Ala Arg Ala Gly Leu Lys Gln Ala
1 5 10 15

Met Asp Asp Val Cys Arg Asp His Glu Pro Ala Leu Ile Thr Arg Leu
20 25 30

Arg Gly Asp His Val Val Met Leu Ser Leu Asp Asp Tyr Asn Ser Met
35 40 45

Ser Glu Thr Met Tyr Leu Leu Gly Thr Glu Ala Asn Ala Lys His Leu
50 55 60

Arg Gln Ser Ile Ala Gln His Lys Ala Gly Lys Ala Phe Val Lys Glu
65 70 75 80

Ile Ser Leu Asp Val Thr Gly Ser Glu Thr Glu Glu
85 90

<210> 101

<211> 82
 <212> PRT
 <213> *Pseudomonas syringae*

<400> 101

Met His Phe Thr Leu Ser Gly Trp Asp Asp Tyr Thr His Trp Lys Asp
 1 5 10 15
 Ala Asp Gln Ala Ile Ser Leu Ser Ile Asp Ser Leu Ile Ser Gln Cys
 20 25 30
 Leu Arg Thr Pro Phe Lys Gly Thr Gly Lys Pro Arg Pro Leu Thr Gly
 35 40 45
 Asp Leu Thr Gly Tyr Trp Ser Arg Arg Ile Thr Lys Glu His Arg Leu
 50 55 60
 Val Tyr Phe Tyr Glu Gly Val Leu Thr Val Ile Ala Cys Arg His
 65 70 75 80

His Tyr

<210> 102
 <211> 64
 <212> PRT
 <213> *Rickettsia conorii*

<400> 102

Met Asn Ser Ile Ser Gly Thr Ser Phe Arg Lys Asn Leu Ser Ser Val
 1 5 10 15
 Leu Asn Thr Val Glu Asn Asp His Val Pro Tyr Leu Ile Lys Arg Lys
 20 25 30
 Asn His Lys Asn Ile Ile Leu Leu Thr Glu Glu Glu Tyr Glu Ser Thr
 35 40 45
 Lys Glu Thr Leu Tyr Leu Leu Ser Asn Leu Gly Leu Met Arg Ile Glu
 50 55 60

<210> 103
 <211> 78
 <212> PRT
 <213> *Rickettsia conorii*

<400> 103

Thr Leu Glu Ser Ala Glu Asp Leu Ala Tyr Trp Lys Lys Tyr Asp Ile
 1 5 10 15
 Lys Lys Tyr Glu Arg Ile Lys Leu Leu Ile Lys Asn Ile Gln Glu Ala
 20 25 30
 Pro Val Thr Gly Ile Gly Lys Pro Glu Pro Leu Lys His Ile Leu Ser
 35 40 45
 Gly Leu Trp Ser Arg Arg Ile Asn His Glu His Arg Leu Ile Tyr Ser
 50 55 60
 Val Asn Thr Lys Gln Ile Ile Tyr Asn Cys Ser Phe His
 65 70 75

<210> 104
 <211> 75
 <212> PRT
 <213> Salmonella typhi

<400> 104

Met Phe Met Arg Thr Val Asn Tyr Ser Glu Ala Arg Gln Asn Leu Ala
 1 5 10 15

Glu Val Leu Glu Ser Ala Val Thr Gly Gly Pro Val Thr Ile Thr Arg
 20 25 30

Arg Gly His Lys Ser Ala Val Ile Ile Ser Ala Glu Glu Phe Glu Arg
 35 40 45

Tyr Gln Thr Ala Arg Met Asp Asp Glu Phe Ala Ala Ile Met Ala Val
 50 55 60

His Gly Asn Glu Leu Arg Glu Leu Ala Asp Lys
 65 70 75

<210> 105
 <211> 122
 <212> PRT
 <213> Salmonella typhi

<400> 105

Met Thr Leu Gln Leu Ile Ser Ala Glu Glu Ile Ile Gln Phe His Asp
 1 5 10 15

Arg Leu Leu Arg Val Thr Pro Gly Val Thr Gly Met Pro Asp Pro Gly
 20 25 30

Arg Ala Glu Ala Leu Met Tyr Arg Val Leu Lys Gln Ile Glu Tyr Glu
 35 40 45

Gly Val Thr Asp Val Trp Leu Leu Ala Ala Met His Leu Leu Ala Ile
 50 55 60

Ser Arg Gly His Ile Phe Asn Asp Gly Asn Lys Arg Thr Ala Leu Phe
 65 70 75 80

Ile Thr Leu Leu Phe Leu Lys Arg Asn Gly Ile Ser Leu Ala Ala Asn
 85 90 95

Pro Asp Phe Val Asp Met Thr Val Asp Ala Ala Ala Gly Arg Leu Thr
 100 105 110

Leu Glu Gln Ile Ala Val Arg Leu Arg Ala
 115 120

<210> 106
 <211> 83
 <212> PRT
 <213> Streptococcus aureus

<400> 106

Met Ile Ile Lys Asn Tyr Ser Tyr Ala Arg Gln Asn Leu Lys Ala Leu
 1 5 10 15

Met Thr Lys Val Asn Asp Asp Ser Asp Met Val Thr Val Thr Ser Thr
 20 25 30

Asp Asp Lys Asn Val Val Ile Met Ser Glu Ser Asp Tyr Asn Ser Met
 35 40 45

Met Glu Thr Leu Tyr Leu Gln Gln Asn Pro Asn Asn Ala Glu His Leu
 50 55 60

Ala Gln Ser Ile Ala Asp Leu Glu Arg Gly Lys Thr Ile Thr Lys Asp
 65 70 75 80

Ile Asp Val

<210> 107
 <211> 88
 <212> PRT
 <213> Streptococcus aureus

<400> 107

Met Ala Arg Leu Asn Ile Thr Phe Ser Pro Gln Ala Phe Glu Asp Tyr
 1 5 10 15

Lys Tyr Phe Gln Gln Asn Asn Lys Lys Met Val Lys Lys Ile Asn Glu
 20 25 30

Leu Leu Lys Ser Ile Asp Arg Asn Gly Ala Leu Glu Gly Ile Gly Lys
 35 40 45

Pro Glu Lys Leu Lys Ser Asn Leu Thr Gly Tyr Tyr Ser Arg Arg Ile
 50 55 60

Asn His Glu His Arg Leu Val Tyr Thr Val Asp Asp Asn His Ile Lys
 65 70 75 80

Ile Ala Ser Cys Lys Tyr His Tyr
 85

<210> 108
 <211> 84
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 108

Met Glu Ala Val Leu Tyr Ser Thr Phe Arg Asn His Leu Lys Asp Tyr
 1 5 10 15

Met Lys Lys Val Asn Asp Glu Phe Glu Pro Leu Thr Val Val Asn Lys
 20 25 30

Asn Pro Asp Glu Asp Ile Val Val Leu Ser Lys Ser Glu Trp Asp Ser
 35 40 45

Ile Gln Glu Thr Leu Arg Ile Ala Gln Asn Lys Glu Leu Ser Asp Lys
 50 55 60

Val Leu Arg Gly Met Ala Gln Val Arg Ala Gly Ser Thr Gln Val His
 65 70 75 80

Val Ile Glu Glu

<210> 109

<211> 84
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 109

Met Leu Leu Lys Phe Thr Glu Asp Ala Trp Ala Asp Tyr Cys Tyr Trp
 1 5 10 15
 Gln Asn Gln Asp Lys Lys Thr Leu Lys Arg Ile Asn Lys Leu Ile Lys
 20 25 30
 Asp Ile Gln Arg Asp Pro Phe Thr Gly Ile Gly Lys Pro Glu Pro Leu
 35 40 45
 Lys Tyr Asp Tyr Gln Gly Ala Trp Ser Arg Arg Ile Asp Ala Glu Asn
 50 55 60
 Arg Leu Ile Tyr Met Met Asp Gly Asp Ser Val Ala Phe Leu Ser Phe
 65 70 75 80

Lys Asp His Tyr

<210> 110
 <211> 87
 <212> PRT
 <213> Streptomyces coelicolor

<400> 110

Met Ser Ile Thr Ala Ser Glu Ala Arg Gln Asn Leu Phe Pro Leu Ile
 1 5 10 15
 Glu Gln Val Asn Glu Asp His Ala Pro Val His Ile Thr Ser Arg Lys
 20 25 30
 Gly Asn Ala Val Leu Met Ser Glu Glu Asp Phe Thr Ala Trp Thr Glu
 35 40 45
 Thr Val His Leu Leu Arg Ser Pro Arg Asn Ala Arg Arg Leu Leu Asp
 50 55 60
 Ser Ile Ala Glu Ala Glu Ala Gly Asp Ala Thr Glu His Asp Leu Ile
 65 70 75 80
 Asp Pro Asp Ala Glu Arg Ala
 85

<210> 111
 <211> 84
 <212> PRT
 <213> Streptomyces coelicolor

<400> 111

Met Arg Ile Thr Phe Thr Ser His Gly Trp Glu Asp Tyr Val His Trp
 1 5 10 15
 Ala Glu Ser Asp Arg Lys Val Thr Lys Arg Ile Asn Arg Leu Ile Ala
 20 25 30
 Asp Ile Ala Arg Asp Pro Phe Lys Gly Val Gly Lys Pro Glu Pro Leu
 35 40 45

32

Lys Gly Asp Leu Ser Gly Tyr Trp Ser Arg Arg Ile Asp Asp Thr His
50 55 60

Arg Leu Val Tyr Lys Pro Thr Asp Asp Gln Leu Val Ile Val Gln Ala
65 70 75 80

Arg Tyr His Tyr

<210> 112
<211> 93
<212> PRT
<213> Streptomyces viridochromogenes

<400> 112

Met Ser Ile Asn Arg Glu Arg Ser Arg Lys Ala Leu Phe Pro Leu Ile
1 5 10 15

Lys Lys Val Asn Asp Asn His Glu Ala Ile Glu Ile Val Ser Lys His
20 25 30

Gly Asn Ala Val Leu Val Ser Ala Glu Asp Tyr Ala Ala Leu Arg Glu
35 40 45

Gly Ser Tyr Leu Leu Arg Ser Pro Ala Asn Ala Arg Arg Leu Leu Lys
50 55 60

Ala Tyr Glu Asn Ala Leu Ala His Val Asn Val Ser Glu Arg Glu Leu
65 70 75 80

Ile Asp Pro Asp Ser Ala Asp Ala Gly Ser Gly Ala Ala
85 90

<210> 113
<211> 84
<212> PRT
<213> Streptomyces viridochromogenes

<400> 113

Met Arg Leu Val Phe Glu Asp Gln Gly Trp Asp Asp Tyr Thr Ser Trp
1 5 10 15

Leu Lys Asn Asp Arg Lys Met Leu Ala Arg Ile Asn Lys Leu Ile Glu
20 25 30

Asp Val Arg Arg Asp Pro Phe Thr Gly Ile Gly Lys Pro Glu Pro Leu
35 40 45

Lys Tyr His Leu Pro Gly Ala Trp Ser Arg Arg Ile Asp Asp Glu His
50 55 60

Arg Leu Val Tyr Leu Val Thr Asp Lys Glu Ile Val Ile Leu Ala Ala
65 70 75 80

Arg Tyr His Tyr

<210> 114
<211> 100
<212> PRT
<213> Synechocystis sp. PCC 7942

<400> 114

Met Ala Lys Cys Tyr Cys Cys Thr Thr Ser Cys Thr Thr Pro Arg Leu
1 5 10 15

Met Lys Val Val Ser Phe Ser Asp Ala Arg Lys Asn Leu Lys Thr Val
20 25 30

Leu Asp Glu Val Val Asn Asp Ala Asp Tyr Thr Ile Ile Thr Arg Arg
35 40 45

Asn Ala Glu Glu Val Val Val Met Ser Leu Asp Ser Phe Asn Ser Leu
50 55 60

Ile Glu Thr Phe His Leu Leu Lys Ser Pro Ala Asn Ala Ala His Leu
65 70 75 80

Gln Arg Ser Ile Ala Gln Tyr Gln Gln Gly Gln Thr Val Glu Arg Asn
85 90 95

Leu Leu Asp Ala
100

<210> 115
<211> 87
<212> PRT
<213> Synechocystis sp. PCC 7942

<400> 115

Met Arg Lys Leu Ala Trp Thr Asn Glu Ala Trp Glu Asp Tyr Leu Tyr
1 5 10 15

Trp Gln Gly Gln Asp Lys Lys Thr Leu Asn Arg Ile Asn Lys Leu Ile
20 25 30

Thr Glu Thr Leu Arg Ser Pro Phe Glu Gly Ile Gly Lys Pro Glu Ala
35 40 45

Leu Arg Glu Asn Leu Thr Gly Phe Trp Ser Arg Arg Ile Asp Asp Thr
50 55 60

Asn Arg Leu Val Tyr Ala Val Ala Asp Asp Tyr Leu Thr Ile Ile Ser
65 70 75 80

Cys Arg Tyr His Tyr Ser Asp
85

<210> 116
<211> 87
<212> PRT
<213> Synechocystis sp. PCC 6803 A

<400> 116

Met Lys Ala Ile Thr Thr Thr Gln Ala Lys Asp His Leu Asp Glu Leu
1 5 10 15

Ile Asn Ala Val Ile Ser Asp Leu Glu Pro Thr Ile Val Ser Asn Asn
20 25 30

Gln Gly Gln Gln Ala Val Leu Ile Ser Leu Asp Glu Phe Asn Ser Trp
35 40 45

Gln Glu Thr Leu Tyr Leu Leu Ser Asn Pro Thr Asn Ala Glu His Leu

50

55

60

Met Ala Ser Ile Lys Gln Ala Glu Thr Gly Gln Ile Ile Lys Gln Lys
 65 70 75 80

Leu Pro Asp Leu Leu Glu Leu
 85

<210> 117
 <211> 86
 <212> PRT
 <213> Synechocystis sp. PCC 6803 A

<400> 117

Met Lys Ile Ala Phe Thr Glu Leu Ser Trp His Asp Tyr Leu Trp Phe
 1 5 10 15

Gln Gln Asn Asp Lys Lys Leu Leu Lys Arg Ile Asn Leu Leu Ile Lys
 20 25 30

Ala Ile Ala Arg Asp Pro Phe Asp Gly Ile Gly Lys Pro Glu Pro Leu
 35 40 45

Lys Ala Asn Leu Ser Gly Tyr Trp Ser Arg Arg Ile Asn Ser Glu His
 50 55 60

Arg Leu Val Tyr Thr Ile Ala Asp Arg Asp Leu Leu Ile Ile Ser Cys
 65 70 75 80

Arg Phe His Tyr Gln Arg
 85

<210> 118
 <211> 87
 <212> PRT
 <213> Synechocystis sp. PCC 6803 B

<400> 118

Met Glu Thr Ile Asn Tyr Gln Gln Phe Ser Glu Lys Leu Pro Thr Leu
 1 5 10 15

Val Glu Lys Ile Gly Asn Glu Gln Glu Pro Leu Cys Leu Glu Leu Pro
 20 25 30

Asn Tyr Leu Arg Ala Val Ile Ile Ser Glu Gln Asp Tyr Arg Ser Leu
 35 40 45

Met Glu Thr Val Tyr Leu Leu Ser Asn Pro Val Asn Ala Glu Lys Leu
 50 55 60

Leu Thr Thr Ala Ser Arg Ser Ile Asp Gln Ala Thr Ser Trp Thr Lys
 65 70 75 80

Val Lys Asn Asp Leu Gly Leu
 85

<210> 119
 <211> 86
 <212> PRT
 <213> Synechocystis sp. PCC 6803 B

<400> 119

35

Met Lys Glu Val Val Leu Asp Ser Gln Ala Ile Glu Asp Ile Lys Trp
1 5 10 15

Trp Ile Gln Gln Asp Lys Lys Leu Ala Leu Lys Ile Met Glu Leu Ile
20 25 30

Glu Thr Leu Pro Lys Ser Pro Phe Ala Gly Lys Gly Lys Pro Glu Lys
35 40 45

Leu Arg Phe Asn Leu Ser Gly Phe Trp Pro Arg Arg Ile Thr Gln Glu
50 55 60

His Arg Leu Val Tyr Glu Val Thr Asp Asp Phe Ile Arg Val Val Ser
65 70 75 80

Cys Arg Tyr His Tyr Arg
85

<210> 120
<211> 80
<212> PRT
<213> Tiobacillus ferrooxidant

<400> 120

Met Ser Thr Leu Thr Ala Ser Glu Ala Arg Ala Asn Leu Tyr Arg Leu
1 5 10 15

Ile Asp Gln Ala Ala Glu Ser His Gln Pro Ile Tyr Ile Ala Gly Lys
20 25 30

Arg Thr Ser Ala Val Leu Leu Ser Thr Glu Asp Trp Glu Ala Ile Gln
35 40 45

Glu Thr Leu Tyr Leu Leu Ser Val Pro Gly Met Arg Glu Ser Ile Lys
50 55 60

Glu Gly Met Ala Glu Pro Leu Ser Lys Ser Asn Met Asp Leu Lys Trp
65 70 75 80

<210> 121
<211> 83
<212> PRT
<213> Tiobacillus ferrooxidant

<400> 121

Met Val Tyr Ser Lys His Ala Gln Lys Asp Ala Lys Lys Leu Ala Ala
1 5 10 15

Ala Gly Leu Lys Asn Asn Ala Ile Glu Leu Leu Ala Val Leu Ala Ala
20 25 30

Asp Pro Phe Gln Asn Pro Pro Pro Tyr Glu Asn Leu Val Gly Asp Leu
35 40 45

Ala Gly Ala Tyr Ser Arg Arg Ile Asn Ile Gln His Arg Leu Val Tyr
50 55 60

Glu Val Phe Pro Lys Glu Arg Val Val Arg Val Leu Arg Met Trp Thr
65 70 75 80

His Tyr Glu

<210> 122
 <211> 83
 <212> PRT
 <213> Yersinia enterocolitica

<400> 122

Met Arg Thr Ile Ser Tyr Ser Glu Ala Arg Gln Asn Leu Ser Thr Thr
 1 5 10 15

Met Val Gln Thr Val Glu Asp Arg Ala Pro Ile Leu Ile Thr Arg Gln
 20 25 30

Asn Gly Thr Ser Cys Val Leu Met Ser Leu Glu Glu Tyr Glu Ser Leu
 35 40 45

Glu Glu Thr Ala Tyr Leu Leu Arg Ser Pro Ala Asn Ala Lys His Leu
 50 55 60

Met Asp Ser Ile Glu Glu Leu Arg Ala Gly Lys Gly Ile Gln Arg Glu
 65 70 75 80

Leu Glu Ala

<210> 123
 <211> 84
 <212> PRT
 <213> Yersinia enterocolitica

<400> 123

Met Lys Ile Ile Phe Ser Ser Cys Ser Trp Glu Asp Tyr Leu Tyr Trp
 1 5 10 15

Gln Gln Thr Asp Lys Lys Ile Leu Lys Arg Ile Asn Gly Leu Val Lys
 20 25 30

Asn Ile Gln Arg Thr Pro Phe Glu Val Lys Gly Lys Pro Glu Pro Leu
 35 40 45

Lys His Asn Leu Ala Gly Phe Trp Ser Arg Arg Met Thr Glu Glu His
 50 55 60

Arg Leu Val Tyr Glu Val Ser Gly Asp Asn Leu Leu Ile Ala Ala Tyr
 65 70 75 80

Arg Tyr Tyr Tyr

<210> 124
 <211> 69
 <212> PRT
 <213> Yersinia enterocolitica

<400> 124

Met Asn Ser Ile Ser Tyr Thr Ala Ala Arg Asn Asn Leu Ala Lys Val
 1 5 10 15

Leu Leu Glu Ala Gln Lys Gln Pro Val Glu Ile Thr Arg Arg Gly Gln
 20 25 30

Ser Glu Val Tyr Ile Ile Ser Lys Ala Asp Tyr Glu Asp Leu Met Lys

35

40

45

Ala Lys Val Lys Ala His Ile Gln Phe Lys His Ala Glu Thr Ile Lys
 50 55 60

Ala Leu Ala Asp Arg
 65

<210> 125
 <211> 118
 <212> PRT
 <213> *Yersinia enterocolitica*

<400> 125

Met Ile Phe Leu Thr Ala Asn Asp Ile Ala Glu Phe Asn Ala Glu Ile
 1 5 10 15

Ile Pro Asn Gly Arg Pro Asp Asn Ser Lys Ile Glu Ala Val Ala Ser
 20 25 30

Arg Val Leu Asn Ala His His Tyr Asp Asn Val Asp Asp Val Tyr Gln
 35 40 45

Leu Ala Ala Ile Tyr Leu Ile Ala Ile Ser Arg Gly His Ile Phe Leu
 50 55 60

Asp Gly Asn Lys Arg Thr Ala Phe Gln Ser Met Ala Leu Phe Leu Gly
 65 70 75 80

Ile Asn Gly Val Asp Leu Cys Ala Ser Asn Gln Leu Glu Glu Leu Thr
 85 90 95

Val Glu Ala Ala Gln Gly Lys Ile Gly Val Glu Gln Ile Thr Glu Gln
 100 105 110

Leu Arg Glu Leu Thr Glu
 115

<210> 126
 <211> 20
 <212> DNA
 <213> Artificial sequence

<220>
 <223> Antisense sequence for YefM antitoxin

<400> 126
 ggatcggggc atgatcttca

20

<210> 127
 <211> 21
 <212> DNA
 <213> Artificial sequence

<220>
 <223> siRNA oligonucleotide

<400> 127
 gccguugaag aucaugccct t

21

<210> 128
 <211> 21
 <212> DNA
 <213> Artificial sequence

<220>

<223> siRNA oligonucleotide

<400> 128

gggcaugauc uucaacggct t

21

<210> 129

<211> 17

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic peptide

<400> 129

Arg Thr Ile Ser Tyr Ser Glu Ala Arg Gln Asn Leu Ser Ala Thr Met
1 5 10 15

Met

<210> 130

<211> 13

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic peptide

<400> 130

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<212> PRT

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Met Asp Ser Ile Asp Ser Leu Lys Ser Gly Lys Gly Thr Glu Lys Asp
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<212> DNA

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<223> Single strand DNA oligonucleotide

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